PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 293007P	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/CA2005/000050	International filing date *(day/month/year)* 18 January 2005 (18-01-2005)	Priority date *(day/month/year)* 26 January 2004 (26-01-2004)

International Patent Classification (IPC) or national classification and IPC
IPC: ***G02F 1/133*** (2006.01) , ***G09F 9/35*** (2006.01) , ***G09F 9/33*** (2006.01)

Applicant
MACMASTER UNIVERSITY ET AL

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. [X] *(sent to the applicant and to the International Bureau)* a total of 5 sheets, as follows:

      [ ] sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      [ ] sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box.

   b. [ ] *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   [X] Box No. I Basis of the report
   [ ] Box No. II Priority
   [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   [ ] Box No. IV Lack of unity of invention
   [X] Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   [ ] Box No. VI Certain documents cited
   [ ] Box No. VII Certain defects in the international application
   [X] Box No. VIII Certain observations on the international application

Date of submission of the demand 28 November 2005 (28-11-2005)	Date of completion of this report 1 June 2006 (01-06-2006)
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476	Authorized officer Karen Oprea (819) 934-2668

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2005/000050

Box No. I Basis of the report

1. With regard to the **language,** this report is based on:

[X] the international application in the language in which it was filed

[ ] a translation of the international application into , which is the language of a translation furnished for the purposes of:

[ ] international search (Rules 12.3(a) and 23.1(b))

[ ] publication of the international application (Rule 12.4(a))

[ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

[ ] the international application as originally filed/furnished

[ ] the description:

[X] pages 1-11 as originally filed/furnished

[ ] pages* received by this Authority on

[ ] pages* received by this Authority on

[ ] the claims:

[ ] pages as originally filed/furnished

[ ] pages* as amended (together with any statement) under Article 19

[x] pages* 12,13 received by this Authority on 3 January 2006 (03-01-2006)

[ ] pages* received by this Authority on

[ ] the drawings:

[X] pages 2/5-5/5 as originally filed/furnished

[X] pages* 1/5 received by this Authority on 3 January 2006 (03-01-2006)

[ ] pages* received by this Authority on

[ ] a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:

[ ] the description, pages

[ ] the claims, Nos.

[ ] the drawings, sheets/figs

[ ] the sequence listing *(specify):*

[ ] any table(s) related to sequence listing *(specify):*

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

[ ] the description, pages

[ ] the claims, Nos.

[ ] the drawings, sheets/figs

[ ] the sequence listing *(specify):*

[ ] any table(s) related to sequence listing *(specify):*

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-5	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-5	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-5	YES
	Claims	None	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: US 5 164 715 (Kashiwabara et al.) 17 November 1992
D2: US 5 661 531 (Greene et al.) 26 August 1997
D3: US 6 369 867 (Ge) 9 April 2002

1.0 Novelty (N)
Subject matter of claims 1-5 is deemed to fulfill the requirements of PCT Article 33(3)

2.0 Inventive Step (IS)
Claims 1-5 are deemed to fulfill the requirement of inventive step under PCT Article 33(3).

D1 discloses a colour display device which comprises a liquid crystal panel wherein any desired number of LCD displays are to be tiled together for controlling the transmission of light. Optical fibers are provided which are fixed to a position on a fiber board, where every red, blue, green colour signal for every pixel assigned through the liquid crystal display panel can be incident and the other end thereof (of the fiber) is fixed to a corresponding position on the printed board on which respective red, blue, green coloured LEDs are mounted for each respective pixel to have full colour display by controlling the drive of the aforementioned LEDs. The display brightness is therefore enhanced through the configuration and better quality is achieved.

D2 discloses a tiled panel display that is visually "seamless" under the intended viewing planar conditions. This invention applies to flat panel displays with a backlight. The panel comprises a tiled array of pixels (RGB) wherein these primary colour elements (RGB-red, green blue) are used. Light used in the LCD is generated in a backlight assembly and projected through the lightvalve (in this case it is fiber) towards the viewer which has a preselected number of pixels. Brightness of the display is restored by boosting the backlight or increasing the light coupling into the lightvalve plane via the tiled arrays.

D3 discloses a full-colour tiled display which uses at least a set of red, green, blue coloured cathode or light emitting diode backlit liquid crystal display. The red, blue, green LEDs can be operated in a colour sequential mode according to the display signal from the display system electronics. The image signal is divided into three sub-fields, red, green, blue (RGB) wherein the LCD displays a red image, the red LED is lighted, when the LCD displays the green image, the green LED is lighted and so on. This enables a full colour image to be displayed. The display brightness and colour quality is therefore enhanced due to backlighting with LED lamps and the need for light absorbing colour filters is eliminated.

D1, D2, D3 all describe a colour display device for enhancing brightness and better quality of the display, however it has been noted that none of these documents disclose or teach a tiled optical fiber display device structure which uses optical fibers to eliminate the use of energy absorbing colour filters in conventional LCD's in order to enable seamless tiling of multiple display modules.
Document D1, even though it teaches a colour display, using optical fibers to better enhance the pixel display resolution, it uses a blue or white lamp with blue filter and requires its own red and green LED into the modulator elements which are then fed to each pixel by the fibers providing a different structure colour display device than the applicant.

continued in Supplemental Box....

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1.0. Claims

The claims do not comply with PCT Rule 6.2(b). The reference characters appearing in the claims should be placed between parantheses.

2.0. Description

The description does not comply with PCT Rule 5 for the following reason:

-the incorporation by reference statement as found on page 1, line 6

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:

Additionally, it has been further noted that D2 discloses a colour tiled liquid display as claimed by the applicant however, D2 discloses that the red, green blue light filters are used in conjunction with light valves which is different from the structure as disclosed by the applicant and further requiring narrow edge seals which are not required in the current application
Lastly, D3 discloses yet another approach to tiling which requires yet again very narrow edge seals on each LCD unit to avoid gaps between tiles which are not required in the current application and further does not use optical fibers as embodied in the structure of claims 1-5.

Therefore, the disclosure of claims 1-5 as claimed by the applicant is inventive in view of the documents cited , thereby fulfilling the requirements of obviousness under PCT Article 33(3).

3.0. Industrial Applicability (IA)
Claims 1-5 fulfill the requirement of Industrial Applicability under PCT Article 33(4).

Conclusions

ARTICLE 33(2) PCT-NOVELTY
The subject matter of claim 1-5 is considered to be novel in view of the prior art on record, thereby fulfilling the requirements of Article 33(20 PCT.

ARTICLE 33(3)PCT-INVENTIVE STEP
The subject matter of claims 1-5 is considered to be inventive thereby fulfilling the requirements of Article 33(3) PCT.

ARTICLE 33(4)PCT-INDUSTRIAL APPLICABILITY
The subject matter of claims 1-5 is considered to be industrially applicable, thereby fulfilling the requirements of article 33(4) PCT.

THEREFORE WHAT IS CLAIMED IS:

1. A tiled optical display, comprising:

at least one display module 10 including

i) a liquid crystal display modulator 20 and an array of light emitting diodes 12, 14, 16 positioned to backlight the liquid crystal display modulator 20, the array of light emitting diodes including at least one each of red, green and blue wavelength emitting light emitting diodes with a beam of light 18 from each light emitting diode being focussed onto a pre-selected region 26, 26, 28 of the liquid crystal display modulator 20 spaced from the light emitted by the other light emitting diodes, each pre-selected region of the liquid crystal display modulator 20 including an array of optical modulation elements 30 such that light from each beam of light 18 passes through one set of corresponding optical modulation elements 30, control means connected to each individual modulation element of each set of optical modulation elements 30 for controlling a desired amount of light from each beam 18 to pass through each individual optical modulation element 30 of the liquid crystal modulator 20; and

ii) a planar view plane 40 having a pre-selected number of pixels 42, each individual optical modulation element 30 having a first end of an optical light guide 34 optically coupled thereto, and a second end of one optical light guide 34 from each pre-selected region 24, 26, 28 of the liquid crystal display modulator 20 being optically coupled to one of the pre-selected number of pixels 42 so each pixel is optically coupled to a red, green and blue light emitting diode 12, 14, 16 mediated by the liquid crystal display modulator 20.

2. The tiled optical display according to claim 1 wherein said optical light guides are optical fibers.

3. The tiled optical display according to claim 1 or 2 wherein the at least one display module 10 is a plurality of display modules, the planar view plane 40 of each display module 10 being tiled together with a planar view plane of at least one other display module 10.

4. The tiled optical display according to claim 1, 2 or 3 wherein each pre-selected region 24, 26, 28 of the liquid crystal display modulator 20 having a beam of light 18 from a light emitting diode 12, 14, 16 focussed thereon includes a pre-selected number of optical fibers having their first ends optically coupled thereto, the first ends of the plurality of optical fibers being arranged symmetrically with respect to the beam of light focussed onto the pre-selected region of the liquid crystal display modulator 20 so that light transmitted by each optical fiber has substantially the same intensity, and wherein the second end of a given optical fiber of the pre-selected number of optical fibers is optically coupled to a different pixel than to which the second ends of the rest of the pre-selected number of optical fibers are optically coupled.

5. The tiled optical display according to claim 1, 2, 3 or 4 wherein each light emitting diode 12, 14, 16 is positioned sufficiently close to the liquid crystal display modulator 20 so that the light beams 18 from each light emitting diode do not mix with the light beams 18 from any other light emitting diode on the pre-selected areas 24, 26, 28 of the liquid crystal display modulator 20.

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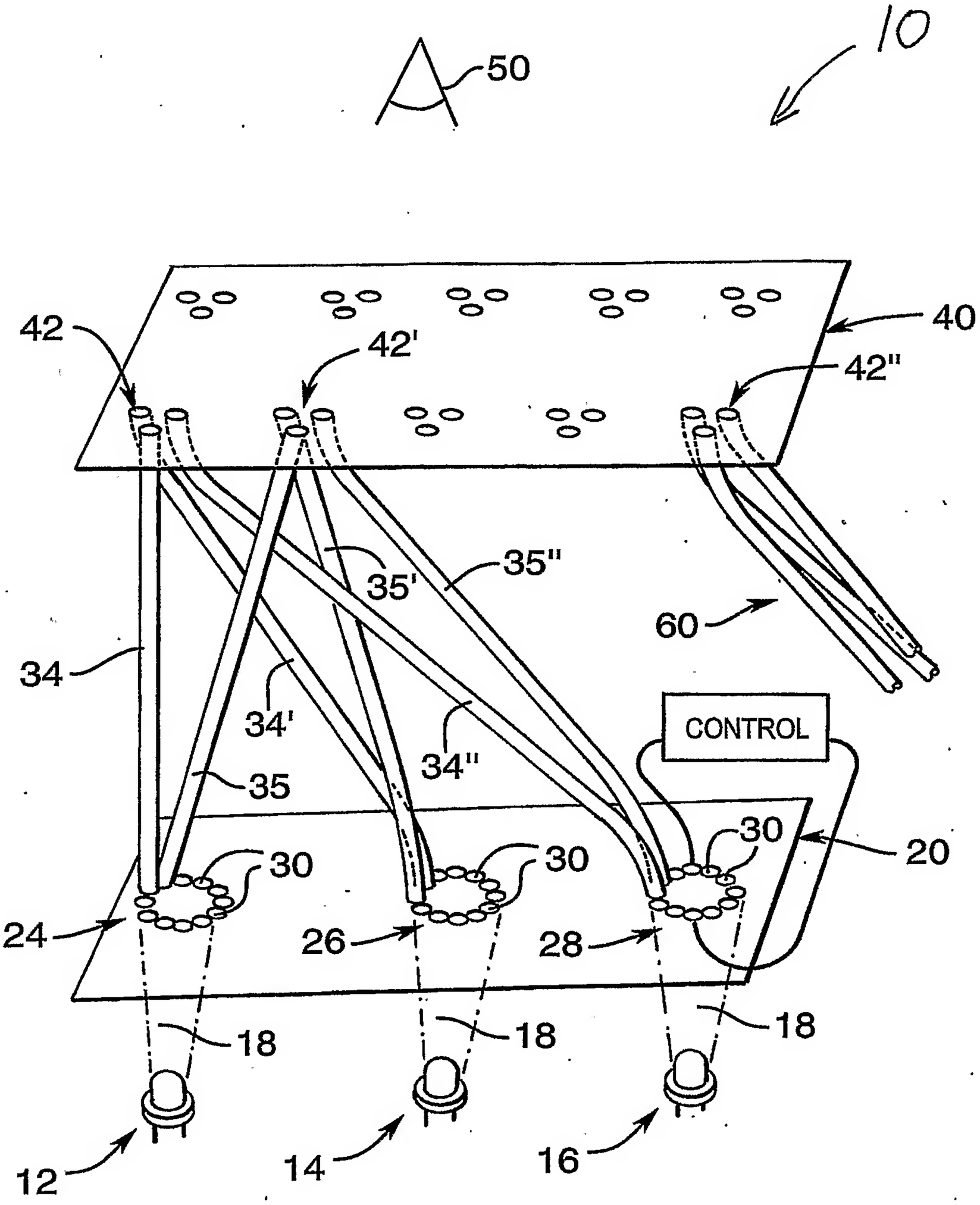

FIG. 1